

REMARKS/ARGUMENTS

Favorable reconsideration of this application in view of the above amendments and following remarks is respectfully requested.

Claims 1, 3-8 and 10-22 are pending in this application. Claims 11-19 are withdrawn from consideration. By this amendment, Claim 1 is amended; Claims 21-22 are added; and Claims 2 and 9 are canceled herewith. It is respectfully submitted that no new matter is added by this amendment.

In the outstanding Office Action, Claims 1-10 and 20 were rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 4,783,368 to Yamamoto.

One of the features of the present semiconductor element heat dissipating member is that a soft material having a Vickers hardness of Hv 400 to 1500 is used for forming the electrically insulating amorphous carbon film. For realizing the softness, hydrogen is contained by an amount of from 20 to 60 %. Accordingly, Claim 1 is amended to recite a content of hydrogen in the electrically insulating amorphous carbon film is in the range of 20 to 60 at.%, and a Vickers hardness of the electrically insulating amorphous carbon film is Hv 400 to 1500.

In the outstanding Office Action, Claims 1-10 and 20 were rejected on the grounds that they lack novelty based on the position that Yamamoto discloses the claimed apparatus and manufacturing method. In particular, the Office Action asserted that Yamamoto discloses a semiconductor element heat dissipating member including a conductive substrate, and an electrically insulating amorphous carbon film including hydrogen, the electrically insulating amorphous carbon film is provided at least on a region of the conductive substrate on which region a semiconductor element is to be provided.

However, Applicants submit that Yamamoto uses a hard carbon material for the insulating material, giving examples such as diamond, and a silicon-containing non single

crystalline material (silicon carbide). Please see at least col. 7, lines 7 and 12. For example, in the embodiment cited in col. 15, line 20, Yamamoto discusses a metal substrate having a high thermal conductivity, and, disposed at least partly thereon, an interlayer composed of a metal having a small coefficient of thermal expansion or an amorphous silicon compound and hydrogen, and an insulating layer having high thermal conductivity (amorphous silicon carbide), in this order.

Yamamoto describes that not less than 20 atm % of hydrogen is included in amorphous silicon when used in forming an interlayer. However, this is not the case when used in forming the insulating layer. Please see col. 17, lines 21-28. In addition, in the example of the embodiment, an interlayer containing amorphous silicon carbide and hydrogen is deposited on the substrate and a silicon carbide layer as an insulating layer is formed on the interlayer. Please see col. 18, line 15 to col. 19, line 10.

It is further discussed in Yamamoto that the surface Vickers hardness of the obtained substrate is 2000 to 3500, which is almost equal to that of single crystalline β -SiC. In this embodiment, Yamamoto stresses that even if an interlayer is disposed on the substrate, a hard carbon material should be used for forming the outermost insulating layer in order to maintain high hardness.

Furthermore, the Office Action acknowledges that although Yamamoto does not state explicitly that the amorphous carbon film has the same Vickers hardness as the claimed invention, Yamamoto uses the same material as presently claimed, such that the present invention cannot be distinguished from that of Yamamoto. However, the descriptions cited in col. 10, lines 24-42, which were cited in the Office Action, disclose the condition that “a hard carbon film” is used, please see col. 10, lines 25 and 38. As such, use of the same material as one or more embodiments of the present invention is not taught or suggested.

Accordingly, as mentioned above, Yamamoto discloses using a hard carbon material for an insulating layer, thereby limiting Vickers hardness of the surface of the substrate from 2000 to 3500 to that of single crystalline β -SiC. Accordingly, Yamamoto does not teach or suggest a soft material for a semiconductor element heat dissipating member as set forth in amended Claim 1, wherein a content of hydrogen in the electrically insulating amorphous carbon film is in the layer, thereby limiting Vickers hardness of the surface of the substrate from 2000 to 3500 to range of 20 to 60 atm % and a Vickers hardness of the electrically insulating amorphous carbon film is Hv 400 to 1500.

With respect to new Claims 21-22, the applied art does not teach or suggest wherein an electrically insulating organic film is provided only on the side of the electrically insulating amorphous carbon film on which side the semiconductor element is to be provided, as recited in Claim 21. Further, the applied art does not teach or suggest wherein an electrically insulating organic film is provided on a part of the surface of the electrically insulating amorphous carbon film in one or more portions of the carbon film that are thinner than other portions of the carbon film, as claimed in Claim 22. As discussed on at least pages 18 and 19 of the present specification, by providing an electrically insulating organic film, the anti-breakdown characteristics can be improved while maintaining superior heat dissipation properties. In contrast, Yamamoto discloses that an organic material is deposited in a gaseous form throughout the chamber. As such, there is no teaching or suggestion for forming the electrically insulating organic film over a part of a side of the electrically insulating amorphous carbon film.

Withdraw of the rejection of the claims under 35 U.S.C. § 102(b) is respectfully requested.


Consequently, for at least the reasons discussed in detail above, no further issues are believed to be outstanding in the present application, and the present application is believed

to be in condition for formal allowance. Therefore, a Notice of Allowance is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below-listed telephone number.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Steven P. Weihrouch
Attorney of Record
Registration No. 32,829

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/07)

Kevin M. McKinley
Registration No. 43,794